IN THE

Supreme Court of the United States.

No. 427 OCTOBER TERM, 1899.

THE CARNEGIE STEEL COMPANY, Limited,
Petitioner,

AGAINST

THE CAMBRIA IRON COMPANY, Respondent.

Brief in Support of Petition for Writ of Certiorari.

William R. Jones, the Manager of the Edgar Thomson Steel Works of the Carnegie Company, invented a process of mixing molten metal for use in Bessemer steel works, which enabled him to secure uniformity of product, at the same time dispensing with a tedious and expensive treatment intervening, under the old practice, between the reduction of the ore in the blast furnace and its conversion into steel at the converters.

The importance of this invention to the art cannot be overstated. Indeed, its great and world wide value and the gravity of the rights of the inventor and the defendant are stated by the Circuit Court as an apology for the exhaustive and scholarly opinion wherein may be found a lucid exposi-

tion of the principles upon which the patent rests and their application to steel production.

The Commissioner of Patents in his report for the year of its birth specifically calls attention to the Jones process patent as one marking the growth of the industrial arts.

It should be here marked that not one of the findings of the Circuit Court as to the validity of the patent, or its vast utility is seriously questioned by the Court of Appeals. That Court reversed the decree of the Circuit Court because it found no infringement of the patentee's process. In reaching this conclusion it radically erred:

a. In its incidental interpretation of the second claim;

b. In considering as conclusive upon complainants a stipulation as to infringement it had timely repudiated for mistake.

The process of Jones is the process that realized the oft expressed hopes of Sir Henry Bessemer and other great manufacturers—that at some time it would be possible to make steel directly from molten metal taken from blast furnaces, without the expense and delay incident to the intermediate cupola process, the only successful method of making Bessemer steel until the Jones method was perfected.

To understand this and its application to the case, it is well to call attention to the history of the art, concerning which no question has been or can be raised.

Prior to Bessemer's discovery of the great principle that iron contains within itself the ingredients for its own purification, and that it can be purified and refined without the use of fuel by blowing a blast of air through a molten mass, thereby consuming the silicon and carbon and other non-metallic constituents, thus fitting it for immediate con-

version into steel by re-carbonization, there had been no such thing known as the production of steel for the grosser uses, such as rails, bridges and structural purposes. Such steel as was produced, for cutlery and use in the finer arts, was the product of puddling furnaces and crucibles, so, as will be seen, the invention of Bessemer was the first great step in the art of steel making as it is now known to the world.

In this Bessemer process of purification the carbon is destroyed, and the mass becomes, after the destruction of the carbon and other non-metallic constituents, pure iron, which is re-carbonized to make steel. The inventor of the present method of re-carbonization was Mr. Mushet, who accomplished it by the introduction of spiegel while the iron was in a molten state and being poured out of the converter in which it was purified, thus converting it into steel. This was the second great step in the art of making steel.

The third and final step in the perfection of the Bessemer process is the one with which we are now dealing. The discovery was a process making practical Bessemer's theory that steel should be made directly from the molten metal as it comes from the blast furnace, without having to pass through the intermediate or cupola process, which involved casting the furnace metal into pigs which, after becoming cold, were assorted, broken up, re-charged and re-melted in a cupola and then placed in a converter for conversion into steel. The Jones method eliminated this altogether.

As has been said, Bessemer contemplated the direct process and believed that it was a valuable part of his invention. The experience of manufacturers, however, demonstrated the impossibility of successfully refining iron di-

rectly from the blast furnace, because of the un-uniformity and irregularity in the non-metallic constituents of the metal, which resulted in such un-uniformity in the finished product as to bar the practice. This was the experience of steel makers throughout the world with the exception of one or two in Europe, where, owing to the peculiarly uniform character of the ore used, the direct process was carried on with measurable success; but in the United States, it was never undertaken without being abandoned, except by the Carnegie Steel Company, which, realizing its tremendous economic advantages, struggled along with various modifications of method until the discovery of Captain Jones made it the perfect success it is to-day.

The attitude of the other American manufacturers towards the direct process was a waiting one; and as to the Cambria Iron Company, the defendant in this case, after having installed at a great expense the apparatus incident to the direct process, and observing its failure where elsewhere undertaken, it abandoned its intention to operate in that way, and its apparatus remained unused until after Jones demonstrated the success of his method, when it was adopted by the Cambria Iron Company, and has been in constant use since.

We make several citations from the record in support of the foregoing, showing that some method to accomplish what Jones actually did accomplish was a great *desideratum* in the art, and one towards which its greatest inventive genius had been directed, and showing also its actual accomplishment by Captain Jones.

These positions were unassailed by proof or argument in the Court below, affirmatively found and elaborated in

the opinion of the Circuit Court, and unnoticed and unchallenged by the Circuit Court of Appeals.

John E. Fry, a skilled Bessemer superintendent, says, (page 740 of Record, question 5):

> "Prior to Jones' invention, metal direct from blast furnaces was used to some extent, but the product was variable, and much steel of inferior quality was made, which could be sold only at a reduced price."

Also, Mr. William Metcalf, a metallurgist of national reputation, said, (Record, page 645):

> "All the evidence of the literature of the Bessemer process goes to show that for years there were serious efforts being made to devise a practical method of using the iron direct from the blast furnace, and to get rid of the serious trouble there is from the fact that a blast furnace is liable to change suddenly and produce an iron varying so much in silicon particularly, and also in carbon as to cause very sudden changes in the working of the iron in the converter, rendering it liable at one time to have the vessels and everything skulled up by a cold heat, or have everything burnt out and ruined by a too hot and wild heat. * * * These extremes * * * were such as to practically eliminate the benefit which it was well known would exist if the metal could be used directly from the blast furnace."

The history of the art as shown in the publications and the patents produced by the defendant is full of confirmation of this:

In a patent, No. 123,312, granted on January 2d, 1872, to Z. S. Durfee, it is said (p. 1, col. 1):

> "In the manufacture of steel by the pneumatic or Bessemer process, a great saving of fuel and iron, of wear and tear of furnaces and of labor, would be ef-

fected were it possible to make uniformly good products of the desired temperature by converting the crude iron immediately it is tapped from the blast furnace in which it is made. This plan has been and may still be practiced to a considerable extent; but it has been found that by reason of the irregular working of blast furnaces, and the consequently varying character and quality of the crude iron produced, it was always very difficult and in most cases impossible to secure such uniformity in the converted metal as was essential to success in the business. Hence at several establishments where the plan of taking the fluid iron as it was tapped from the blast furnaces and pouring it at once into the converter has been practiced, it has been abandoned, the proprietors preferring to incur the expense of handling and remelting the crude iron after it has been cast into pigs, in order thus to secure the advantage of carefully selecting and mixing the materials for each charge to be converted."

In a paper published in the "Journal of the Iron and Steel institute" in 1874, and printed on pages 1045–1059 of the Record, we read (page 1048):

"Sir James Ramsden said, with reference to Mr. Williams' remarks as to the proposal for running the fluid iron direct into the Bessemer converter, the subject had been under the consideration of the Barrow Company for some time; in fact, they had tried some practical experiments, and arrived at the conclusion that, as far as their knowledge went, it was a very doubtful undertaking. Certainly they could not produce the quality of steel that was necessary to satisfy the market at that time."

Mr. Julian Kennedy, the great mechanical engineer, says (Record, page 690, question 20):

"The Jones method has made the direct process, which was attended with great dangers and difficulties before the date of his invention, a thoroughly practicable and successful one. Instead of it being a question of great doubt whether to run the metal direct to the converter, or remelt it as it was up to the time of the Jones invention, no one would now think of building a new works containing both furnaces and converters without arranging to mix the metal by the Jones method, which not only effects an immense saving in the cost of operating the works, but enables a uniformly good product to be made, and also a purer product than can be obtained from cupola metal, which absorbs and is contaminated by sulphur from the coke which constitutes the fuel of the cupola. * * * Jones' invention has solved a difficulty and met a great want which has been felt ever since the invention of the Bessemer process in 1856, and has enabled that process to be used with direct metal as Bessemer first proposed to use it. Bessemer, however, failed in his efforts to overcome the difficulty, and from that time many metallurgists and inventors have sought to solve the problem, but without success, until Jones made the invention in suit."

Mr. William Metcalf, speaking of the position of the Jones process in the art, says (page 945):

"It practically eliminated all these (prior) troubles, and gave to the world a great advance in the art of manufacturing Bessemer steel."

There stands, therefore, as we say, found by the Circuit Court and unchallenged by the Circuit Court of Appeals, the two fundamental facts:

(*a*) The direct Bessemer process was not practical.

(*b*) Jones by his invention made it so.

It is therefore clear, the validity of the Jones patent being decreed that complainant was entitled to maintain its bill if defendant infringed. This is the sole point decided against us, and this is predicated upon obvious errors in law in interpreting the patent, and of law in the consideration as evidence of the repudiated stipulation.

As succinctly as possible let us state the essence of the Jones patent. The end in view and the difficulties encountered have been sufficiently set out. What was sought was a method of making good, uniform steel from metal taken directly from the furnace, *i. e., steel direct from ore without loss of the initial heat that reduced the ore.*

The obstacle to be surmounted was the inability to obtain uniform charges for the converter from metal direct from the furnace. This un-uniformity is stated by the patentee in his patent (Record, page 1244) in these words:

> "In practice it is found that metal tapped from different blast furnaces is apt to vary considerably in chemical composition, particularly in silicon and sulphur; and such lack of uniformity is observable in different portions of the same cast, and even in different portions of the same pig. * * * The consequence of this tendency of the silicon and sulphur to segregate or form pockets in the crude metal is that the product of the refining process in the converters or otherwise in like manner lacks uniformity in these elements, and therefore often causes great inconvenience and loss, making it impossible to manufacture all the articles of a single order of homogeneous composition. Especially is this so in the process of refining crude iron taken from the smelting furnace and charged directly into the converter without remelting in a cupola, and

although such direct process possesses many economic advantages, it has on this account been little practiced."

The patentee then goes on to state how he proposes to obviate this difficulty, in the following language:

"For the purpose of avoiding the practical evils above stated, I use in the refining process a charge composed not merely of metal taken at one time from the smelting furnace, but of a number of parts taken from different smelting furnaces, or from the same furnace at different casts, or at different periods of the same cast, and subject the metal before its final refining to a process of mixing, whereby its particles are diffused or mingled thoroughly among each other, and the entire charge is practically homogeneous in composition, representing in each part the average of the unequally diffused and segregated elements of silicon and sulphur originally contained in each of the several parts or charges. By proceeding in this way not only is each charge for the refining furnace or converter homogeneous in itself, but, as it represents an average of a variety of un-uniform constituent parts, all the charges of the converter from time to time will be substantially uniform, and the products of all will be homogeneous."

After referring to a convenient form of apparatus, which is the subject of a separate patent, the patentee then claims, in the second claim, (being the only claim in question), as follows (Record, page 1246):

"In the art of mixing molten metal to secure uniformity of the same in its constituent parts preparatory to further treatment, the process of introducing into a mixing receptacle successive portions of molten metal un-uniform in their non-metallic constituents (sulphur, silicon, &c.), removing portions only of the composite molten contents of the receptacle without entirely

draining or emptying the same, and successively replenishing the receptacle with fresh un-unifrom additions substantially as and for the purposes described."

The mischief, it will be observed, was not in the presence of non-metallic constituents in the iron, nor their presence in a greater or less percentage, but was the un-uniformity or fluctuation as between different charges in the converter, producing the mischief described by all the witnesses. Jones corrected this by (in the words of the claim)

> "introducing into a mixing receptacle successive portions of molten metal un-uniform in their non-metallic constituents, removing portions only of the composite molten contents of the receptacle without entirely draining or emptying the same, and successively replenishing the receptacle with fresh un-uniform additions, substantially as and for the purpose described."

This requires but a glance to disclose that the spirit of his invention was the constant maintenance in the mixing receptacle of a dominating mass or pool, in which the successively injected charges would lose their identity and from which portions only could be withdrawn for use in the converter representing the average of the un-uniformity of each part, accomplishing thereby the end desired.

The Circuit Court of Appeals found that the patent is not susceptible of this interpretation, in the following language:

> "We find nothing in the patent which warrants us in determining that the inventor had in mind that the residue to be left in the receptacle should form a dominating pool."

This, we humbly contend, is a fatal error of interpretation.

The words "dominating pool" do not appear in the patent. It is a term adopted early in the case as descriptive of the function of that portion of the contents of the mixer allowed to remain in the receptacle, sufficient to effect the averaging of the different charges and securing practically homogeneous results.

In one part of the patent, the patentee refers to the quantity remaining as "considerable"; in other parts, synonymous terms are used; in *all* parts the idea stands out that sufficient must remain to accomplish the end indicated.

The language of the claim itself, however, is sufficient to illuminate this error of the Court of Appeals; indeed, the difficulty seems to lie in making the second claim more perspicuous by language and arrangement other than its own. The claim is:

> 2. "In the art of mixing molten metal to secure uniformity of the same in its constituent parts preparatory to further treatment, the process of introducing into a mixing-receptacle *successive* portions of the molten metal un-uniform in their non-metallic constituents (sulphur, silicon, &c.), removing *portions only* of the *composite* molten contents of the receptacle *without entirely emptying or draining the same*, and *successively replenishing the receptacle with fresh un-uniform additions*, substantially as and for the purpose described."

Thus, successive portions are introduced, making a *composite* body of metal, *portions only of* the *composite* contents are removed without entirely emptying or draining the same, but nothing is removed until the composition is effected, which removals are replenished by fresh un-uniform

additions. Again stated, the patentee's idea was, as claimed, to successively, (*e. i.*, following in order or uninterrupted course) introduce un-uniform metal until the contents formed a composite body, then remove portions only of the "composite contents" without emptying the receptacle, and successively replenish with other un-uniform additions. To replenish means to restore what has been withdrawn. "To fill again after being diminished." What, then, can be more clear than that, the composite mass once created and absolute directions given to successively replenish, (*i. e.*, following in order or uninterrupted course) withdrawals therefrom the patentee in the most specific terms, and without more, described a permanent pool, called dominating by common consent, because its function was to accomplish the purpose of the process, that is, blend the differing characteristics of the units of its composition into a composite whole.

The fact of a dominant pool, though it is true no such term is used, is the pith and marrow of Jones' claim. The word replenish of that claim (note its derivative significance *plenus*,—full, and *re*,—again) in connection with the process shown in the claim, viz: "removing portions only" and "successively replenishing," unquestionably show that *re*filling the vessel, and therefore constant maintenance of fullness, was the one especial fact, the novelty Jones did claim. By the very laws of nature the inevitable sequence of successive replenishing, where portions only are removed, is and of necessity must be a permanently maintained (and therefore a dominant) pool.

We can imagine the surprise of the defendant when its eye rested upon the only assigned reason for the reversal of the decree of the Circuit Court, viz: "*The defendant's device does not infringe the second claim of the patent in suit.*" This surprise would spring from its recollection of the fact that infringement was never seriously questioned, the defense being an assault upon the patent itself. The Chief Engineer of the defendant, Mr. Joseph Morgan, Jr., testified (record, page 597): "With the exceptions of additions of cupola metal, (immaterial to the process) *I do not know that there is any "material difference between our practice and that described in the second claim.*" All the other testimony was to the same effect, and cannot be more forcibly stated than in the language of the opinion of the Circuit Court, as follows:

> "Has infringement been shown? In this connection, the question of the apparatus employed is of importance only as bearing on its adaptability for the practice of the Jones process, for infringement of process, not apparatus, is charged. Respondent's apparatus consists, since November, 1895, of a large, covered, refractory-lined vessel of about three hundred tons capacity, adapted to be tipped by hydraulic pressure, having a receiving hopper at the rear end and a pouring spout at the front. Both a blast-furnace plant and cupola system supply metal for its Bessemer converter plant, the former about two-thirds, the latter one-third, the metal used. It is to be noted that the cupola system continues, since the installation of the reservoir, to deliver its metal by ladle to the converter direct, and not through the reservoir. The metal from the blast furnace enters the receiver in approximately fifteen ton ladle lots, and is withdrawn in approximately twelve ton ladle ones. Mr. Joseph Morgan, Jr., Chief

Engineer of the respondent company, states that 'in accordance with the natural way of using a reservoir, it is ordinarily kept well-filled up.' The minimum amount maintained in respondent's reservoir is proved by Mr. Levi T. Upton, as follows:

"Q. Did you see any mark upon the mixer, and if so, was your attention called to it in any way?

A. My attention was called to a chalk mark, which, by the way, I had noticed before, on the side of the mixer. They told me they didn't allow them to run that chalk mark below the floor. When it came to the floor they still had retained in the mixer about 175 tons.

Q. Please state what you mean by the chalk mark coming to the floor.

A. What they call the mixer floor, is where the men work to rotate or tilt the mixer, and if the mark they have on the mixer goes on the floor out of sight, they cannot tell how much they have left.

Q. Am I to understand you that the mixer was not to be tilted more than enough to bring the chalk mark on a level with the mixer floor?

A. That is the meaning I wish to convey, and if they hadn't enough to make out their heat without going below the floor, they wait until they get more in.

Q. Who explained this to you?

A. The Superintendent of the Bessemer department.

Q. What is his name?

A. F. G. Parker.

Q. I understand, then, if the chalk mark did not go below the level of the mixer floor there would be 175 tons of metal retained in the mixer. Is this correct?

A. Yes, sir.

Mr. Parker was not called to dispute this statement.

Mr. John E. Fry, an experienced theoretical and practical steel maker, testifies to the operative process, as follows:

"On Monday, March 29, 1897, I saw the metal mixer used at the Cambria Iron Works. Its principle of construction is similar to the Jones mixer, and its operation is identical with that set forth in Jones' patent.

"When I saw it in use it contained a relatively large body of molten metal which had been brought to it from the blast furnaces while liquid, and relatively small portions of such metal were added to its contents from time to time, and other portions were poured from it into a changing ladle and taken to the converters for conversion into steel. In these operations care was taken to maintain in the mixer a relatively large quantity of metal so that the portions added would remain for a sufficient time subject to the mixing effects of the mixer before being withdrawn. This to 'average up' the chemical constituents of the metal and make the fluctuations gradual as is done in the Jones method.

"Owing to, or in conformity with shop rules, the withdrawals of the converter charges of mixed metals were made with approximate regularity of time intervals, and the additions and withdrawals were made as near as 'time about' as possible. The additions were about one-fourth larger than the withdrawals, say five of the latter to four of the former, so that the additions were balanced by the withdrawals.

"An oil-vapor jet was used for heating the empty mixer preparatory to serving it with metal at the beginning of the week's work, but after a quantity of metal was added that was above the established minimum of one-half full, there was no further need for the vapor jet and it was shut off.

"The normal position of the mixer when not in use was upright and in this position it received the additions of molten blast-furnace metal. In making a withdrawal the mixer was tipped or rocked forward, and it

was returned to its normal condition when the withdrawal had been made. A mark was placed on the outside of the mixer so as to move relatively to the motion of the mixer in pouring out metal. There was a chalk mark or white line, and in addition there was a graduated gauge board. The mark was placed relative to a fixed point, so that about one-half the capacity of the mixer would represent the minimum amount of metal desired to be retained for mixing effects.

"It is quite clear, in view of these facts, that infringement takes place. That initial mixing rather than storage is the purpose of the reservoir is shown by the fact that the cupola metal is not stored, but served direct in ladles to the converter plant. And that the homogeneous mixture once obtained is used as a dominant pool to produce a graduated, non-abrupt product, is shown by the chalk-line minimum limit of one hundred and seventy-five tons. With such a permanent dominant pool in constant use, we are clear that respondent's practice infringes the second claim of the Jones patent in both letter and spirit. Indeed, Mr. Morgan himself says, 'With the exception of additions of cupola metal, I do not know that there is any material difference between our practice and that described in the second claim.' The exception noted can have no effect on the question of infringement. In substance, as carried on by respondents, it is a disconnected operation, wholly independent of the mixer. The only exception being where there was not sufficient cupola metal for a full converter charge, the shortage was drawn from the mixer."

"For the reasons stated, we are of opinion that infringement of the second claim is shown."

In view of this overwhelming evidence, including the admission of the defendant's chief engineer as to the fact of

infringement, the conclusion reached by the Circuit Court of Appeals that the defendant did not infringe is seemingly inexplicable. It is not predicated upon the testimony of any single witness, it is not a conviction produced by any serious argument. It has its foundation, however, incorporated in full in the opinion of the Circuit Court of Appeals, and it is a bed of sand. It is a so-called "stipulation" entered into between counsel "showing the manner in which the defendants use what is alleged to be the infringing device."

This stipulation contains a statement, "That the amount of molten metal in said mixer varies from nothing to its full capacity;" in relation to which the Circuit Court of Appeals finds, "It is stipulated that the amount of molten metal ordinarily kept in the reservoir is more than one-half its capacity, but that it varies from nothing to its full capacity, depending on the supply and demand. Doubtless under the ordinary conditions there is a mixing of the molten metal when the partially filled vessel is replenished, but it is only such mixing as is incidental to the pouring together of mixible liquids under the well known principle of diffusion."

It was error, we claim, on the part of the Court of Appeals to predicate its opinion as to the fact of infringement upon this alleged stipulation rather than upon the uncontradicted evidence in the case, and for this reason:—

The stipulation as to that question was repudiated.

The history of this alleged stipulation may be found on pages 97–8 of the Record. It was a stipulation made, as will there appear, for the convenience of defendant's

counsel. It was made while a witness was upon the stand, called by the complainant to prove the use by the defendant of complainant's process. It was a statement by defendant's counsel of facts peculiarly within the knowledge of his own clients, having relation to their own operations. It contained the language made the corner-stone of the opinion of the Court of Appeals, namely, that the variation in the quantity of molten metal in the mixer was from nothing to its full capacity, depending upon supply and demand.

It subsequently coming to the knowledge of complainant's counsel that in this vital respect defendant's counsel had made a mistake, and that defendant's practice was in fact to constantly maintain the dominating pool, complainant at once, and upon the record, repudiated the binding effect of the stipulation, as will appear upon page 638 of the Record, in these words:

> *By complainant's counsel:* "It appearing from the testimony of the witness, Joseph Morgan, Jr., (Defendant's Chief Engineer) that the information given by the defendant and embodied in the stipulation printed on pages 97–98 of the record is in some respects at variance from the facts as explained by Mr. Morgan in his deposition, complainant's counsel hereby notifies defendant's counsel that in so far as the said variance appears, the said stipulation will not be used by him at the hearing."

Being pressed by defendant's counsel to state the variance, complainant placed upon the record the following (p. 639): Complainant's counsel stated "that the said stipulation or admission in its statement 'that the amount of molten metal in the mixer varies from nothing to its full capacity" to be that portion of the stipulation which was at

variance with the facts. Whereupon, in view of the complainant's objection and misunderstanding as to the effect of defendant's chief engineer's evidence, defendant's counsel recalled Mr. Morgan upon the question at issue alleged to have been covered by the stipulation, namely, the practice as to the quantity of metal kept in the mixer, and the witness replied "I believe our practice is to keep the reservoir well filled up," thus maintaining the dominating pool, the minimum quantity of which, in defendant's practice, as heretofore stated, was about 175 tons.

The legal question involved in all this is, may a stipulation as to facts peculiarly with the knowledge of some party be held to be binding upon the other who, upon discovery of a mistake, promptly repudiates it, especially where the other party subsequently calls witnesses to testify as to the disputed point?

If this Court answer the question negatively, then it sweeps away the whole foundation of the judgment of the Circuit Court of Appeals, and justifies us in invoking the supreme authority to command the record to be sent up to the end that this Court may hear and determine the case according to law.

Had the Circuit Court of Appeals followed and given force and effect to the rulings and decisions of this Court, established in like cases, the result would have been different.

In the *Barbed Wire Patent*, 143 U. S., 275-283, this Court said:

> "In the law of patents it is the last step that wins. It may be strange that, considering the important results obtained by Kelly in his patent, it did not occur

to him to substitute a coiled wire in place of the diamond-shaped prong, but evidently it did not; and to the man to whom it did ought not to be denied the quality of inventor. There are many instances in the reported decisions of this Court where a monopoly has been sustained in favor of the last of a series of inventors, all of whom were groping to attain a certain result, which only the last one of the number seemed able to grasp."

In *Keystone Mfg. Co. vs. Adams*, 151 U. S., 144–145, this Court said:

"It must be admitted that both of these patents granted to Augustus Adams, one in 1861 and the other in 1866, describe mechanical contrivances closely resembling the invention in question. * * * But, as we have seen, *when the test of practical success is applied*, the conclusion is favorable to the last patent.

"Where the patented invention consists of an improvement of machines previously existing, it is not always easy to point out what it is that distinguishes a new and successful machine from an old and ineffectual one. But when, in a class of machines so widely used as those in question, it is made to appear that at last, after repeated and futile attempts, a machine has been contrived which accomplishes the result desired, and when the Patent Office has granted a patent to the successful inventor, the courts should not be ready to adopt a narrow or astute construction fatal to the grant."

In *Simonds Rolling Machine Co. vs. Hathorn Mfg. Co.*, 93 F. R. 958–962, the Court of Appeals for the First Circuit said:

"If the question of identity of method and result is doubtful, the doubt must be resolved in favor of the suc-

cessful patentee, who has in a practical way materially advanced the art."

To the same effect are the cases of *Loom Co. vs. Higgins*, 105 U. S., 580–591; *Consolidated Valve Co. vs. Crosby Valve Co.*, 113 U. S., 157; *Magowan vs. New York Belting Co.*, 141 U. S., 332; *Gandy vs. Main Belting Co.*, 143 U. S., 587; *Krementz vs. Cottle*, 148 U. S., 556-561.

A glance at the record discloses that to throw light upon the vital issues in the case, the files of the Patent Office of Europe and America and all the literature of the art were resorted to. The most eminent experts available contributed their opinions, being exhaustively examined and cross-examined upon the questions of utility, novelty and anticipation. It would serve no useful public end to allow this decision of the Court of Appeals, indecisive as to all questions of public importance and mistaken as to its one decisive position, to stand unreviewed. While upon the contrary, a definite adjudication of the main questions will set at rest a contention between the patentee and the other manufacturers of Bessemer steel (for whom in reality this defendant stood), obviously to the great relief of all concerned and the public as well.

An additional consideration of weight and importance in this connection is the international interest in the case. The Jones process, its utility, novelty and principles, were considered and discussed by eminent scientists of Great Britain and the Continent. Joseph Massenez, a Belgian engineer, in a leading paper read before the British Iron & Steel Institute of 1891 (Record, page 1214), stated:

> "This disadvantage of the irregular composition of the individual blast furnace charges is obviated in a simple and effective manner by W. R. Jones' mixing process. * * * * Only a portion of the pig iron placed in the mixer is taken for further treatment of steel, whilst new supplies of pig iron are brought from the blast furnace. In this way homogeneity sufficient for practical purposes is obtained."

In discussing this paper at that meeting, the eminent English metallurgical authority, Sir Lowthian Bell stated (Record, page 1219):

> "Since they had begun to use the mixer, the defectives from whatever cause, had fallen to something like half of what they had been before. The expense of working the mixer was little or nothing."

This was followed by the acquisition by Mr. Evans, of the Barrow Works in England, of an English patent on the Jones process, and its subsequent introduction at the Barrow Works, Bolckow, Vaughan & Co., Northeastern Steel Co., and The Dowlais Company in England, and also works in Germany and Belgium.

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